Investigation of rain attenuation in equatorial Kuala Lumpur

Abstract :

This letter investigates rain attenuation in Kuala Lumpur, Malaysia, by exploiting local drop size distribution (DSD) measurements. Coefficients for the well-established power-law model relating rain rate and specific attenuation are derived for frequencies in the Ku-, Ka-, and Q/V-bands based on three years of disdrometer data. We analyze the diurnal variation of rainfall rate for four time intervals and, moreover, we present statistics of rain attenuation for slant-path Earth-space links estimated by means of a new model (Stratiform-Convective SST) that combines the advantages of the Dual-Layer Synthetic Storm Technique (SST) and the SC EXCELL model. The predicted statistics are in good agreement with those obtained from beacon measurements (MEASAT-1 satellite at 12 GHz). Finally, the diurnal variation of the slant-path rain attenuation is presented to provide system operators and radio communication engineers with useful information on the quality of service (QoS) that can be achieved during a typical day on an Earth-space link.